

A new and unusual species of *Parachiton* (Mollusca: Polyplacophora) from South Africa

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A new species of the genus *Parachiton*, *P. hodgsoni* n.sp., which inhabits shallow water off the South African coast, is described. The radula is unusual for the genus *Parachiton*. It consists of about 160 transverse rows of very small mature teeth of which the major lateral teeth have very narrow tridentate cusps. The intermediate valves are granulose with the granules arranged in widely spaced, longitudinal rows on the central area of the valves. There are 20–31 longitudinal rows on the central areas of the intermediate valves. Variability in the morphology of the tail valve is shown.

Key words: chiton taxonomy, Lepidopleurina, Leptochitonidae, shell valves, radula, morphology.

INTRODUCTION

The first species of the genus *Parachiton* (*P. africanus*) (Leptochitonidae Dall, 1889) was described by Nierstrasz (1906). By 1980 a further nine species had been described. After examination of extensive material in various museums worldwide, Kaas and Van Belle described four additional species (Kaas & Van Belle 1985, 1990). More recently, one new species was described by Strack (1993) from the Red Sea and a further seven from southern Japan by Saito (1997). Species of *Parachiton* live in tropical and subtropical regions, from the rocky intertidal zone to depths of up to 150 m. All of them have a characteristically sculptured tegmentum and an unusually long tail valve. In addition, the major lateral teeth of the radula have wide tridentate cusps with rounded denticles.

One specimen of the new species of *Parachiton* was found amongst polyplacophoran samples from Gonubie, South Africa, sent to me by A. Hodgson. Further specimens were later collected from various localities on the South African coastline. Although the exterior features of this new species (both valves and girdle) are very similar to most other species of *Parachiton*, its radula is notably different. This aim of this paper is to describe this new species of *Parachiton*.

Parachiton hodgsoni n.sp., Figs 1–4

Type material. Holotype: False Bay, Glencairns, 34°10'S, 18°27'E, under stones at low-water mark, 23–24 March 1996, B. Sirenko & I. Smirnov leg., holotype (Zoological Institute St.-Petersburg, N2147) (6.5 mm) now disarticulated. *Paratypes:* 46

(Zoological Institute St.-Petersburg, N2148) (2.5–7.1 mm), two of them now disarticulated: *South Africa, Eastern Cape Province:* 20 km E East London, Gonubie 32°57'S 28°01'E, June 1995, Alan Hodgson leg., 1 (6 mm); Shelly Beach, 1.5 km W Cape Recife, 34°25'S 25°40'E, intertidal, under stones, 20 Jan. 1996, B. Sirenko & I. Smirnov leg., 8 (3.0–5.2 mm); Port Alfred, 33°36'S 26°54'E, stones lying on bedrock, intertidal, 21 Jan. 1996, B. Sirenko & I. Smirnov leg., 2 (6.0 mm); 30 km E East London, Glen Eden, 32°55'S 28°05'E, stones lying on bedrock, intertidal, 24 Jan. 1996, B. Sirenko & I. Smirnov leg., 1 (5.5 mm). *Western Cape Province:* False Bay, 2.5 km S Simon's Town, Oatlands, 34°14'S 18°29'E, stones lying on bedrock, intertidal, 16 March 1996, B. Sirenko & I. Smirnov leg., 1 (5.0 mm). False Bay, Glencairns, intertidal, 19 March 1996, B. Sirenko & I. Smirnov leg., 6 (3.0–7.1 mm); False Bay, Sandy Cove and Glencairns, 34°10'S 18°27'E, under stones in intertidal pool, 23–24 March 1996, B. Sirenko & I. Smirnov leg., 7 (2.8–6.0 mm).

Diagnosis

Size small, up to 7.1 × 3.2 mm (holotype 6.5 × 3.2 mm), elongate, length greater than twice the width, moderately elevated (dorsal elevation 0.41–0.44), back subcarinate or evenly rounded; valves brittle, not beaked, head valve wider than tail valve, tegmentum fairly coarsely granulose, granules arranged in longitudinal rows with wide interspaces on central area of intermediate valves and antemucronal area of tail valve, and in rather tight radiating rows on head valve, lateral area of intermediate valves and post-mucronal area of tail valve; radula with about 160 mature transverse

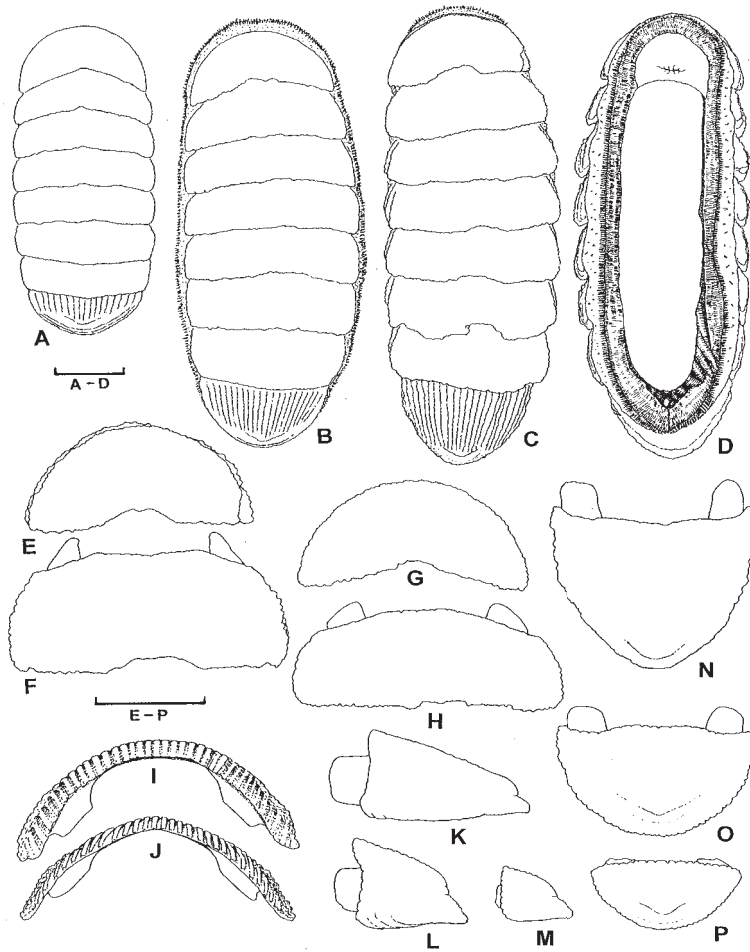


Fig. 1. *Parachiton hodgsoni*, holotype (B, G, H, J, L, O); paratype, length 7.1 mm (C–F, I, K, N); paratype, length 4.8 mm (A), paratype, length 2.7 mm (M, P). A–C, whole specimen, dorsal view; D, whole specimen, ventral view; E, G, valve I, dorsal view; F, H, valve V, dorsal view; I, J, valve V, anterior view; K–M, valve VIII, lateral view, N–P, valve VIII, dorsal view. Scale bar = 1 mm.

rows of teeth; teeth very small, tridentate cusp of major lateral tooth thin and long; 6–7 ctenidia on both sides.

Description of holotype

Body small, elongate-oval in outline, moderately elevated (dorsal elevation 0.42), valves subcarinate, thin and brittle. Colour of valves: ivory-coloured in newer regions of shell, rust-coloured in older regions of shell.

Head valve semicircular, 1.16 times wider than tail valve. Intermediate valves broadly rectangular, side margins rounded in front, posterior margin almost straight, damaged apices not visible, lateral areas only discernible by difference

in sculpture. Tail valve semi-ovate, small, length: width ratio about 0.58, mucro small, posterior, hind slope steep, straight. Tegmentum fairly coarsely granulose, granules coalescing and arranged in radiating rows on head valve, lateral areas of intermediate valves and post-mucronal area of tail valve. Granules arranged in 31 widely spaced longitudinal rows on central areas of intermediate valves and antemucronal area of tail valves. The interstices as wide or wider than the chains. Each granule usually with three aesthete pores, medium pore larger than the others.

Articulamentum weakly developed, more or less transparent, apophyses very small, wide apart, triangular on intermediate valves, almost trape-

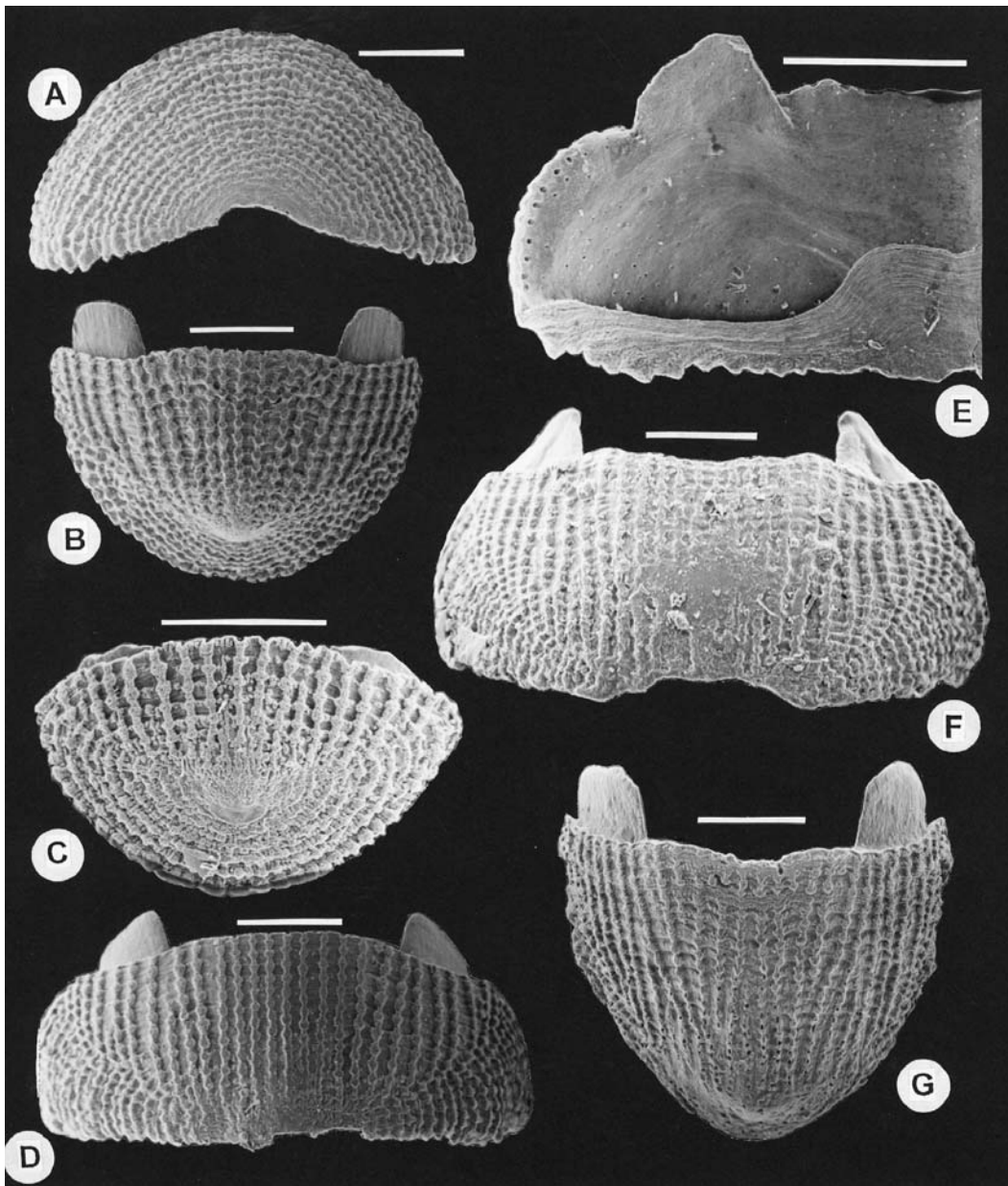


Fig. 2. Scanning electron micrographs of valves of *Parachiton hodgsoni*. A, B, D, E, holotype; C, paratype, length 2.7 mm. F, G, paratype, length 7.1 mm. A, valve I, dorsal view; B, C, G, valve VIII, dorsal view; D, F, valve V, dorsal view; E, valve V, ventral view. Scale bar = 50 μ m.

zoid on tail valve.

Girdle very narrow, width near valve IV seven times smaller than width of valve, yellowish to ochre, dorsally clothed with broad, slightly curved scales $50\text{--}55 \times 35 \mu\text{m}$, each sculptured with 16–18 riblets, interstices about same width as riblets; scales somewhat smaller ($26 \times 17 \mu\text{m}$) and sculp-

tured with 5–8 riblets near margins. Scattered at random among scales are long, striated glassy needles (long spicules) about $155 \times 11 \mu\text{m}$, each needle embedded in a minute chitinous cup. Ventrally the girdle is paved with concentric rows of imbricate, elongate scales. The scales are bluntly pointed distally, infra-marginal ones $63 \times 18 \mu\text{m}$

with five weak riblets on distal half, scales near pallial groove smaller, $24 \times 15 \mu\text{m}$. Girdle margin with a fringe of long needles similar to those on its dorsal surface.

Radula 1.9 mm in length with 157 mature transverse rows of very small teeth, in all about 180 rows. Central tooth long and narrow. First lateral tooth props up the base of major lateral tooth. Cusp of major lateral tooth very narrow and tridentate, median denticle largest, denticles pointed, not bluntly rounded.

Gills long, seven on each side, extending from anus to beginning of valve VII.

Variability

The paratypes show some variability in valve proportions, specimens having either long or short shells (Table 1).

Specimens with short shells (including the holotype) predominate. Compared to the holotype, the 7.1 mm-long paratype has a longer shell, more rounded valves, larger dorsal girdle elements (scales and needles) and longer radula (2.1 mm) with 160 mature (in all about 190) rows of teeth. Colour of tegmentum is white in small specimens (length $< 4\text{--}5 \text{ mm}$) and stained reddish by foreign deposits in large specimens (length $> 5.5 \text{ mm}$).

Distribution

Parachiton hodgsoni has a rather wide distribution in the lower intertidal and shallow subtidal zones along the southern Cape coast of South Africa, from Glen Eden (East London) to False Bay. It may also occur along the Transkei coast of the Eastern Cape Province, but samples of chitons have not been collected there. *P. hodgsoni* is the most southern species in the genus *Parachiton*.

Habitat

The species inhabits rocky shores where it lives under stones in intertidal pools or near 0 m. It prefers to live near the sand/stone interface where oxidation of iron salts occurs. The red colour of the shell in old specimens is possibly caused by these oxidized salts.

Etymology

Named after Prof. Dr Alan Hodgson from Rhodes University, who studies the biology of South African marine intertidal invertebrate fauna (including chitons) and who found the first specimen of this species.

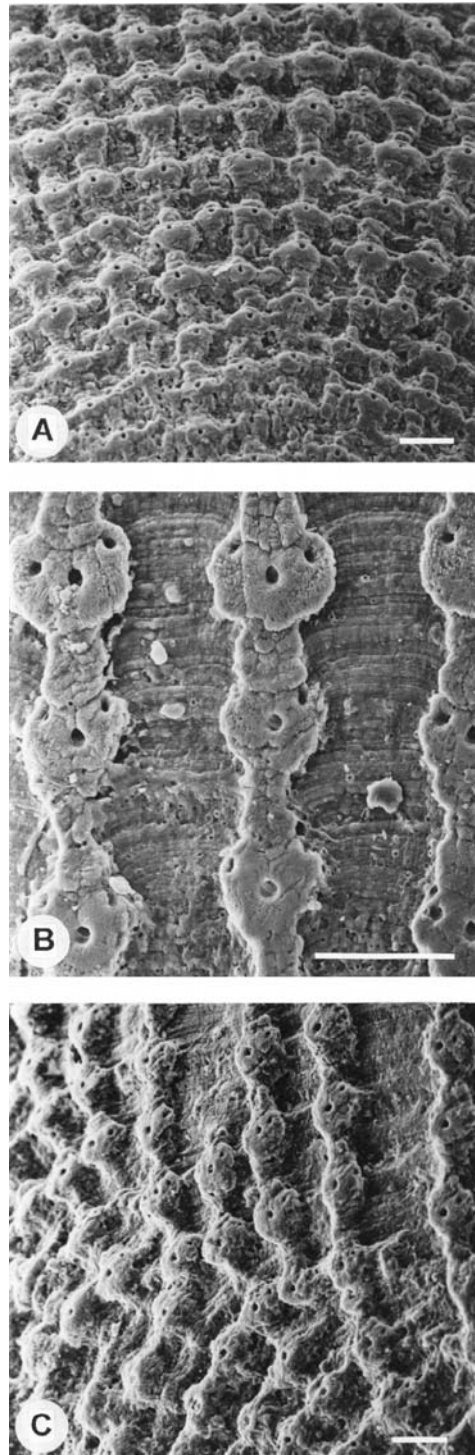


Fig. 3. Scanning electron micrographs of the dorsal surface of valves of the holotype of *Parachiton hodgsoni*. **A**, valve I; **B**, central area of valve V; **C**, central and lateral areas of valve V. Scale bars = $50 \mu\text{m}$.

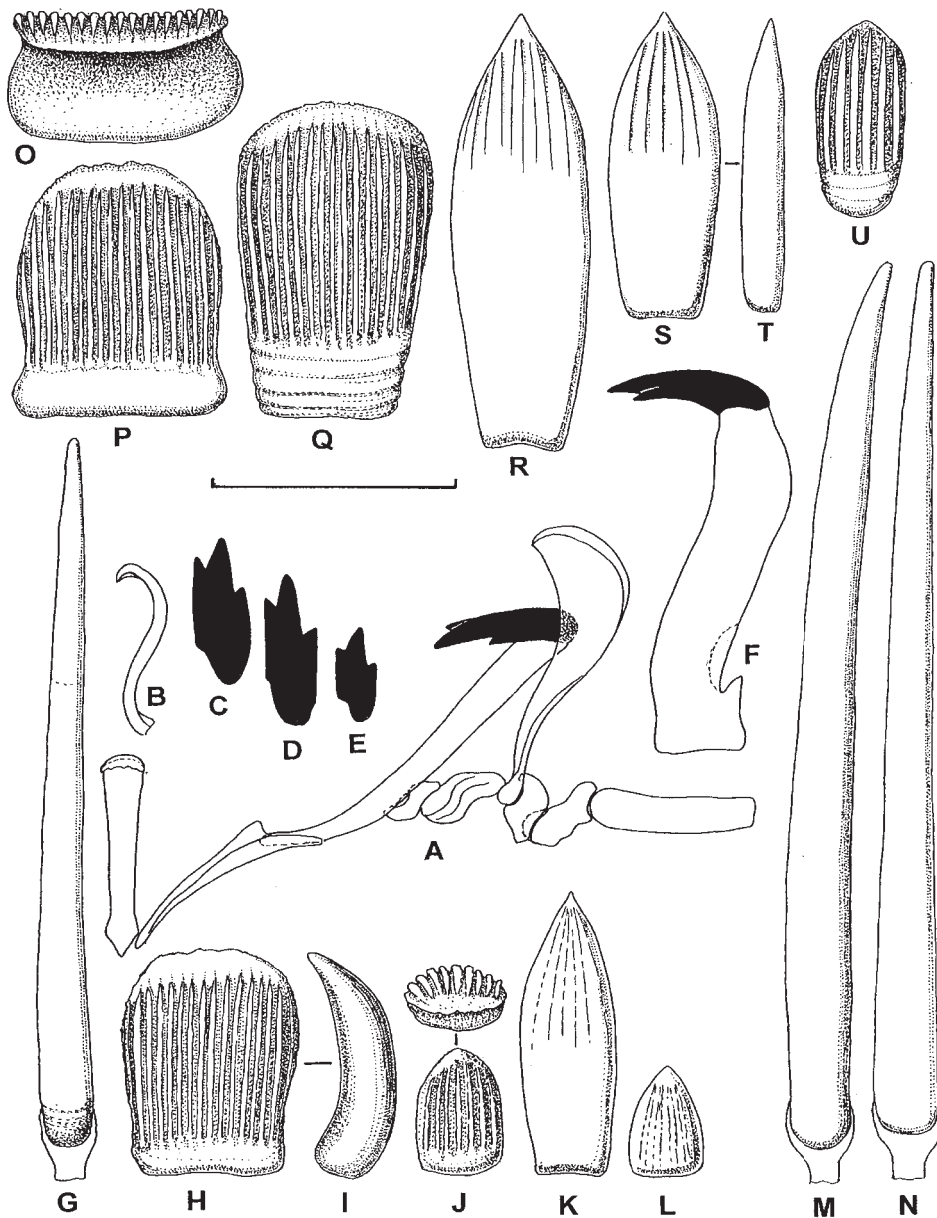


Fig. 4. *Parachiton hodgsoni*, holotype (A–B, D, F–L); paratype, length 7.1 mm (C, M–U); paratype, length 2.7 mm (E). A, half of transverse row of radula; B, central tooth; C–E, blade of major tooth; F, major lateral tooth; G, M, N, dorsal needles (long spicules); H, I, O, P, Q, dorsal scales; J, U, dorsal scales near margin; K, L, R–T, ventral scales. Scale bar = 50 μ m.

DISCUSSION

This new species of *Parachiton* has a radula which is quite distinct from that of other members of this genus. Whereas *P. hodgsoni* has a radula of which the cusp of each major lateral tooth is very small and long, in other species these cusps are large and

broad. *P. hodgsoni* differs from *P. indecorus* (Kaas & Van Belle, 1990) which occurs off the Zululand coast of South Africa (12–70 m), in having fewer and more widely spaced longitudinal rows of granules on the central areas of the intermediate valves (20–31 rows in *P. hodgsoni*; more than

Table 1. Variability of shell valves of *Parachiton hodgsoni*.

Body length (mm)	Width:length of valve V	Width of valve I: width of valve VIII	Width:length of valve VIII	Anterior:posterior length of valve VIII
Specimens with short shells				
2.5	3.90	1.00	1.80	1.28
3.7	3.27	1.07	1.81	1.78
4.7	2.73	1.05	1.67	1.66
4.9	2.47	1.09	1.47	1.88
6.5*	2.50	1.16	1.68	2.38
Specimens with long shells				
5.5	No data	No data	1.45	3.46
6.5	2.36	1.11	1.31	3.71
7.11**	2.13	1.11	1.12	4.33

*Holotype; **paratype

60 rows in *P. indecorus*), and in having rows of granules on the lateral areas.

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